

## ABSTRACT

Apparatus and methods are provided for interacting light with particles, including but not limited to biological matter such as cells, in unique and highly useful ways. Optophoresis consists of subjecting particles to various optical forces, especially optical gradient forces, and more particularly moving optical gradient forces, so as to obtain useful results. In one implementation, a population of particles, comprising two or more differing particles, e.g., red blood cells and white blood cells, are illuminated by a line of light which is moved slowly relative to the particle population. The particles are moved with the line until the population is aligned. Next, the line of particles is subject to relative motion of light relative to the particles, such as by rapidly moving the line of illumination relative to the physical position of the particles. By moving the line away from the particles at a rate great enough that certain particles remain behind, effective separation, characterization and/or identification of the particles may be made. Optionally, the direction of the low initial scan is in a direction opposition to the more rapid scan after the particles have been aligned.